SENTIENT MACHINE

The Sentient Machine is an LFO modulated resonant lowpass filter with two different voices: A standard wah sound and a special vowel type sound. At slow speeds it produces a spacey sweeping sound reminiscent of a phaser.

The vowel voice mode is achieved by modulating an additional filter that is tuned higher and sweeps in the opposite direction. It's a combination of filters sometimes referred to as a formant filter. This circuit uses PWM and CMOS switches as variable resistors insted of vactrols or jfet's, which gives a perfectly matched set of variable resistors and more accurate modulation at low resistances.

Happy building and playing!
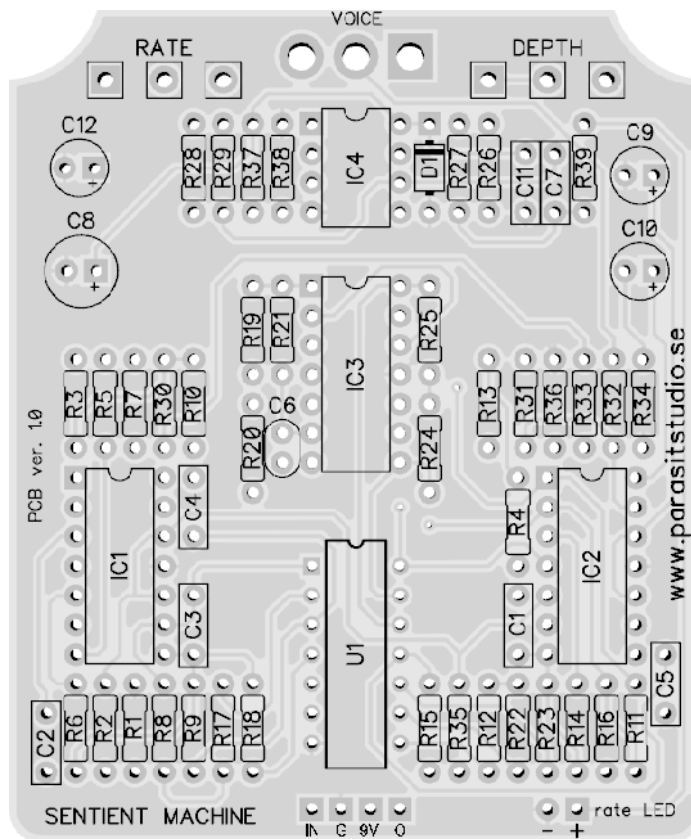
General builds tips

- Solder the low profile components first, from short to tall height. Recommended order: resistors, diodes, IC socket, film-caps, electrolytics, pots and switches
- CMOS chips are very sensitive to static charges and can be easily damaged. It's a good idea to wear a anti-static wristband or at least avoid wearing a wool jumper and petting your cat/dog while building...
- Always use sockets for IC chips and transistors to avoid heating them directly. It also makes it much easier to swap them out if needed.
- Pay special attention to the orientation of the diodes and electrolytics.
- This PCB's is designed for 16mm Alpha PCB mounted angeled pots. You could also use solder lug type and just tack some "legs" with short pieces of wire to each pot to mimic a PCB mount type.
- The pots and the switch are meant to be mounted on the bottom (solder side) of the board, and soldered on the top (component side).
- The square pad represents pin 1 of each pot.

Wiring

For more info on how to wire up the stompswitch, jacks ect, please visit the Parasit Studio website and download the PDF called "offboard wiring". You can find it here:

http://www.parasitstudio.se/build-docs.html

The Sentient Machine Bill Of Materials (BOM)

Resistors

R1	1M	R28	4.7K
R2	1M	R29	680K
R3	10K	R30	100K
R4	220R	R31	100K
R5	10K	R32	100K
R6	10K	R33	68K
R7	10K	R34	100K
R8	10K	R35	10K
R9	10K	R36	10K
R10	10K	R37	10K
R11	10K	R38	10K
R12	10K	R39	4.7K*
R13	220R	CLR*	
R14	10K		
R15	10K		
R16	10K		
R17	1K		
R18	1K		
R19	10K		
R20	8.2K		
R21	47K		
R22	1K		
R23	1K		
R24	10K		
R25	10K		
R26	47K		
R27	33K		

IC's

IC1	TL074
IC2	TL074
IC3	TLE2074**
IC4	TL062
U1	CD4066

Potentiometers

DEPTH	C5K
RATE	B100K

Switches

VOICE	SPDT on/on

Capacitors

C1	47nF
C2	100nF
C3	47nF
C4	150nF
C5	47nF
C6	100pF
C7	100nF
C8	100uF
C9	47uF
C10	2.2uF
C11	100nF
C12	47uF

Diodes

|	
D1	1N4001
2x LED's	

- * This is a current limiting resistor for the rate indicator LED. The other CLR is a current limiting resistor for the bypass LED which both needs to be wired offboard. Use the appropriate value for your LED type.
- ** **This specific opamp (TLE2074) is critial for this circuit to function. Do NOT substitute it for a TL074 or any other common quad op amp!** *This high speed op amp is used as a high frequency trianglewave oscillator for the PWM. A normal op amp is not fast enough and will distort the waveshape resulting in a non-functioning circuit. So far I have not found any working substitute.*
- Not included in the BOM but also good to have: enclosure, input and output jacks, DC jack, LED bezels, 3PDT switch, knobs

Drilling template (125B)
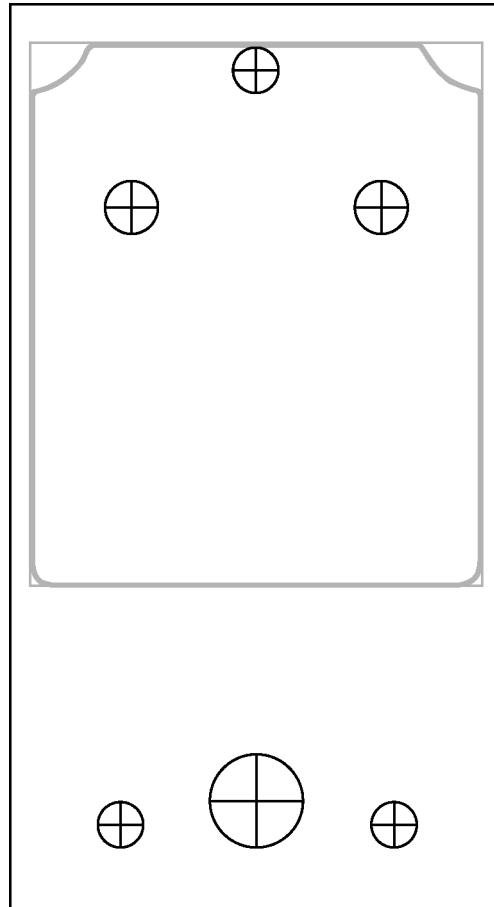
- Use at your own risk! This template is approximate.
- Make sure your printer isn't doing any scaling / is set to 100% print size.
- The two bottom side holes are just suggestions for where to place the bypass and rate indicator LED.
- Drill footswitch, LED's, DC jack and input/output jacks to your own preference. There is room for the DC jack at the top side if you drill it close to the bottom. This PCB is a tight fit:
- **Measure and confirm before drilling!**

Schematic
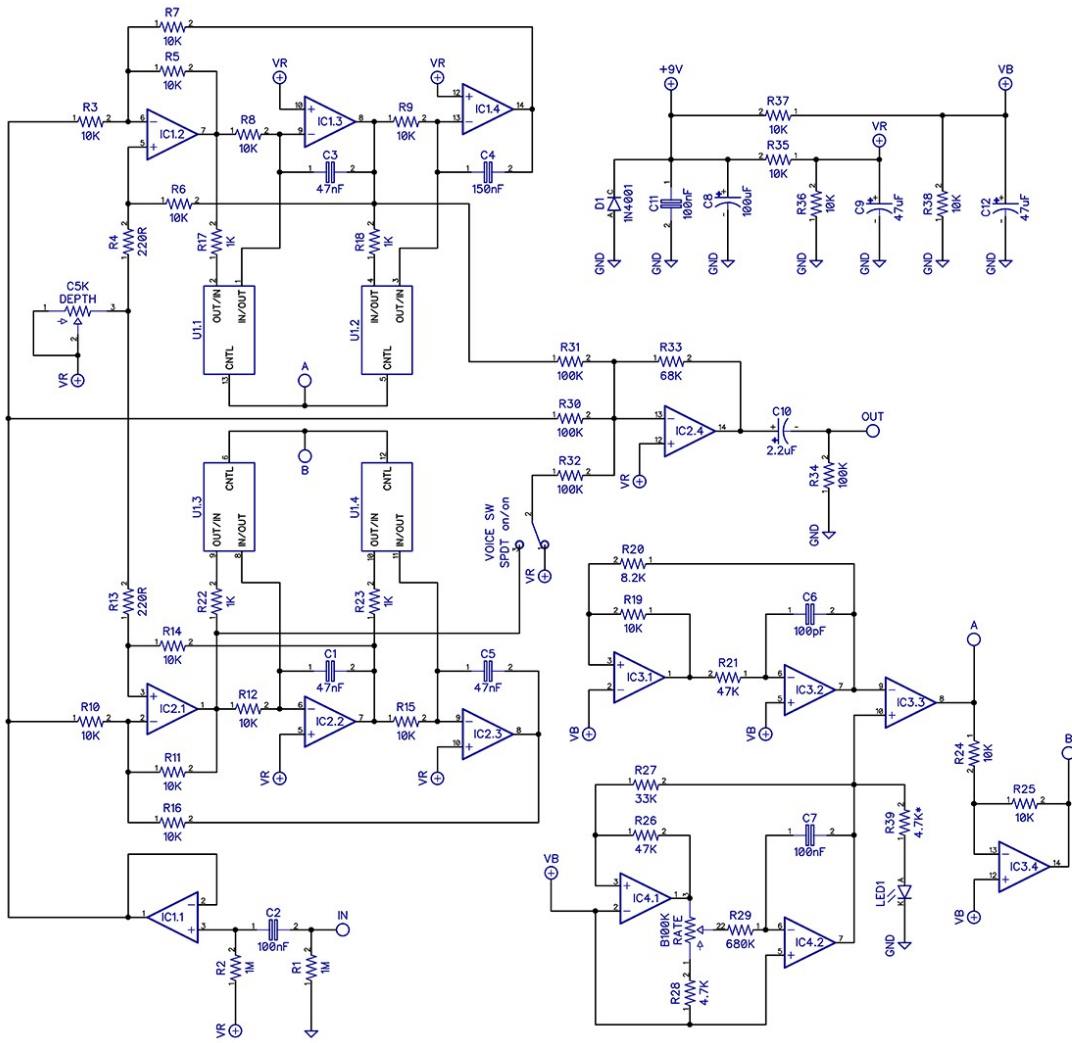
Troubleshooting

There's always a chance of running into trouble. To minimize error, follow the BOM and general building tips carefully. Take your time and don't rush. Take a break now and then. Use good solder, and it helps to have a decent soldering station insted of a cheap iron.

Make sure you have a good regulated powersupply. This circuit in perticular can be very noisy with unregulated power.

If you are still having trouble, please visit the madbean forum Parasit Studio subforum section and ask for help there.

http://www.madbeanpedals.com/forum/index.php?board=84.0

If you have bought the Musikding kit and have recieved a faulty or missing component, please contact musikding directly.

https://www.musikding.de/kontakt.php?lang=eng

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